

MICROFOSSILS IN CHONDRITIC METEORITES FROM ANTARCTICA? STAY TUNED. L. H. Burckle¹ and J. S. Delaney², ¹Lamont Doherty Earth Observatory of Columbia University, Palisades NY 10064, USA (burckle@LDEO.columbia.edu), ²Department of Geological Sciences, Rutgers University, 610 Taylor Road, Piscataway NJ 08854-8066 (jsd@rci.rutgers.edu).

Controversies surrounding the alleged occurrence of Martian life forms in a meteorite recovered from Antarctica require that the Antarctic environment be critically assessed as a source of terrestrial biogenic contaminants. Carbon isotopic evidence that terrestrial organics have indeed invaded the ALH 84001 achondrite is compelling. However, the vector by which they were introduced into the meteorite is not well defined. The organic molecules recognized provide limited information about the original host. For example, they may be introduced as discrete organic molecules by some ice/water transportation mechanism or by eolian processes. They may also be a by-product of the breakdown of microscopic life forms that were transported and lodged in the meteorite during their residence on the Antarctic ice. The East Antarctic Icefield, from which most Antarctic meteorites have been concentrated and collected, is a locus for portions of the global circulation pattern. Two atmospheric processes are capable of transporting terrestrial biotic remains onto the East Antarctic Plateau; (a) atmospheric lows form off the Antarctic coast and occasionally penetrate far inland and (b) the polar cell which transports air (and micrometer-sized particles) from lower latitudes through the upper atmosphere to the south polar region where it descends. This air spreads out radially across the plateau as inversion winds and, at the margin of the plateau becomes katabatic winds that are easily capable of displacing even gravel sized particles. Indeed, such winds are known to transport meteorites across the blue ice fields and are a major contributor to the deflation of the blue ice surface. It is reasonable to suggest that micrometer to millimeter sized objects are also easily transported. Because microfossils from both the Southern Ocean and more northerly sources have been identified in Antarctic ice at South Pole Station and at Station Dome C [1,2], we suggest that global circulation plays a role in transporting microfossils (diatoms and opal phytoliths) onto the Antarctic continent. We further suggest that the occurrence of such microfossils on the East Ant-

arctic Plateau may be used to address some questions concerning alleged martian life forms as well as high southern latitude atmospheric circulation. Many recent microfossils still contain associated organic materials and represent a readily identifiable source of contaminants in meteorites. The importance of these microfossils has also been recognized in the Transantarctic Mountains where implausible climate change models have been falsified by the recognition of air borne microfossils [3,4]. A search for similar microfossils has been initiated treating the Antarctic meteorite collections as potential hosts. The initial study involves small ordinary chondrites of high metamorphic grade for which there is absolutely no evidence or even a suggestion that extraterrestrial life forms may be present. The meteorites are chosen to be somewhat fractured so that good sites are available to trap windblown particles. The unbroken main masses of the meteorites are transported to a clean room and the storage bags unsealed there. The meteorite is then immersed in double distilled water and sonified to dislodge dust from the cracks and surface. This dust is transferred to microscope slides under clean room conditions, and examined microscopically for microfossils. The initial work involves two chondrites each from Allan Hills and the Queen Alexandra Range; results will be reported at the Dublin meeting. If microfossils from mid-latitude sources are identified then we suggest that other micrometer scale particles such as smog, perhaps with associated PAH, from Southern hemisphere cities may also occur in Antarctic meteorites. If sufficient microfossils are present in individual meteorites they may be concentrated for extraction and characterization of their organic fractions.

References: [1] Burckle L. H. et al. (1988) *Geology*, 16, 326–329. [2] Kellogg D. E. and Kellogg T. B. (1996) *Geology*, 24, 115–118. [3] Bleakley N. (1996) Msc. thesis, Victoria University of Wellington, 273 p. [4] Burckle L. H. and Potter Jr., N. (1996) *Geology*, 24, 235–238.